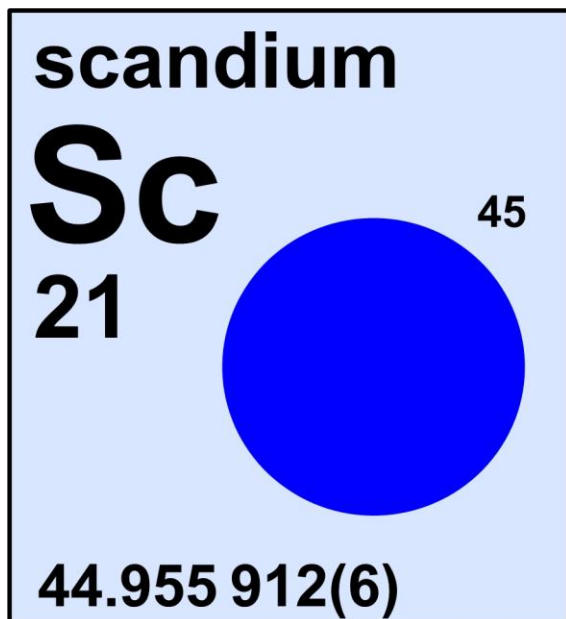
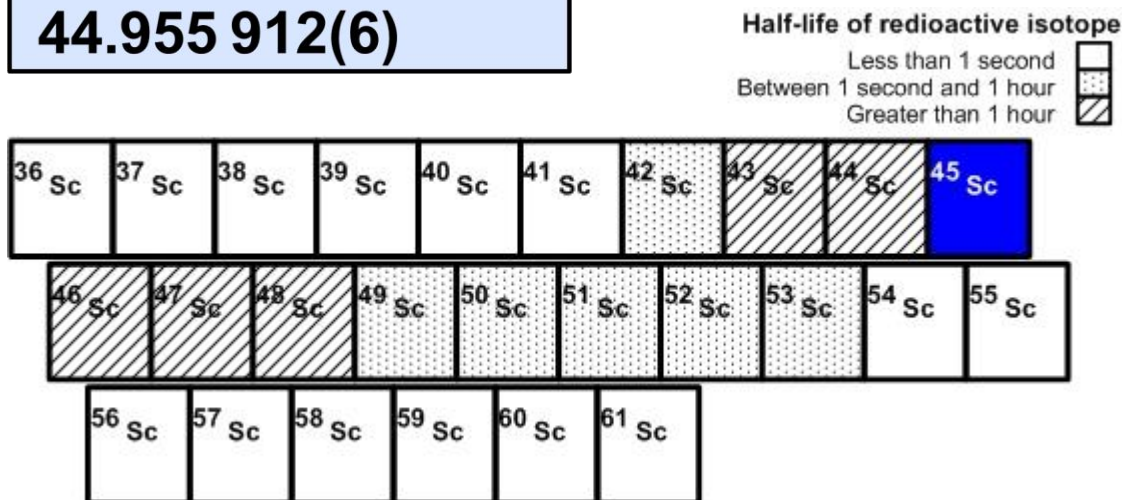


scandium



Stable isotope	Atomic mass*	Mole fraction
⁴⁵ Sc	44.955 9119	1.0000

* Atomic mass given in unified atomic mass units, u.



Important applications of stable and/or radioactive isotopes

Isotopes in medicine

- 1) ⁴⁶Sc is used as a non-absorbed reference material for determining digestibility and gastrointestinal absorption and secretion sites for nutrients associated with feed residues in ruminating animals.
- 2) ⁴⁶Sc is used in isotope-carrying antibodies and bonded with tumor associated cell surface antigens. ⁴⁶Sc is added to DPTA-derivatized monoclonal antibody and has been shown to target specifically tumor cells in vivo and to accumulate to high levels in the tumor.
- 3) ⁴⁶Sc has high energy gamma emissions which makes it cytotoxic without requiring internalization.

Isotopes in industry

- 1) ⁴⁶Sc is a beta emitter and can be used in oil refinery crackers for crude oil as a tracing agent.

Isotopes in tracer studies

- 1) Radioactive isotope ^{46}Sc can be used for sediment labeling. This helps to determine the transportation of sediments by water flow in rivers, estuaries, harbors and seas. The half life of ^{46}Sc is about 84 days and when released into an estuary with similar grain density and grain size a gamma spectrograph can be used to measure the intensities of ^{46}Sc in the sediments and the movement of sediments can be determined.
- 2) Coastal engineers use ^{46}Sc to develop dredging strategies and to design navigation channels based on silt movement.

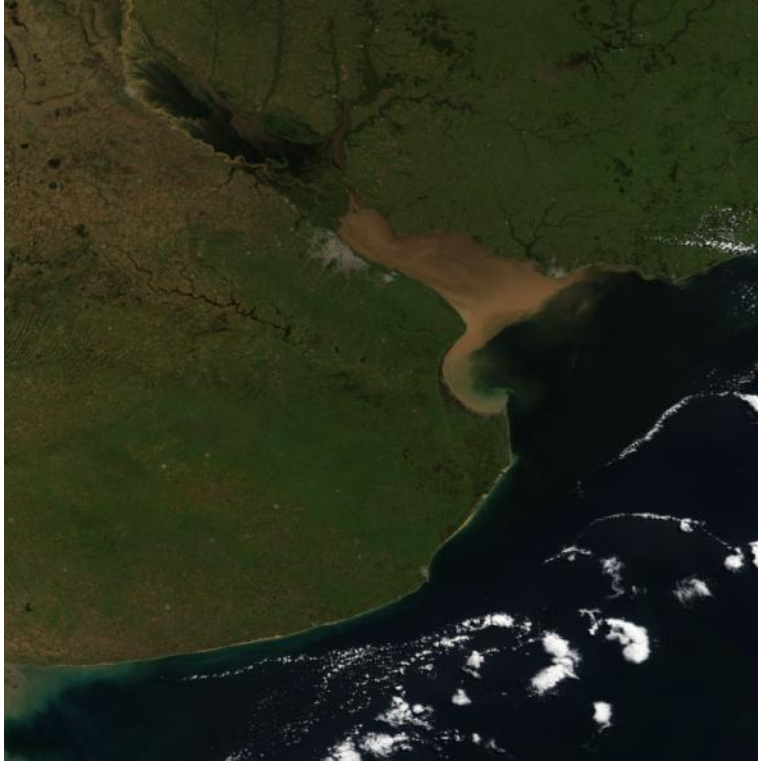


Figure 1: Sediment flow in Argentina after flooding.